

Generating the Trends and Forecast of Crime Rates in Ozamiz City, Philippines

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ABSTRACT

Crime is considered as a serious issue. It makes people worried on their own safety especially when the crime rate is increasing. The study generated the trend analysis and forecasted data of the recorded crimes in Ozamiz City using autoregressive integrated moving average through the GRTEL software. Results showed that majority of the crimes recorded decreased from 2018 to 2021. These include crimes against person, crimes against property, crimes against personal liberty and security and violations against special laws particularly the comprehensive dangerous drugs Act of 2002. However, the violators who resisted persons in authority drastically increased. On the other hand, forecasted data revealed that most of the crimes will most likely increase in occurrence in the year 2022 and will be stabilized in the remaining years. The data gathered from this study can be used by the different law enforcement agencies in planning and creating intervention strategies towards mitigating the occurrence of crimes in Ozamiz City.

Keywords: Pandemic, Law enforcement, Time series, Trend analysis, Violators.

1. Introduction

The Revised Penal Code (Republic Act No. 3815) is the basic legislation of the Philippines, defining criminal acts and establishing consequences for their conduct (Robles, 2015). There are two types of crimes: index and non-index. Index crimes are substantial in character and occur frequently and consistently enough to serve as a barometer of the crime situation (murder, homicide, physical injuries, carnapping, cattle rustling, rape, robbery and theft). Non-index crimes, on the other hand, are minor offenses and breaches of particular legislation such as the Comprehensive Dangerous Drugs Act of 2002, unlawful logging, and other ordinances (Ramos, 2020).

A crime is an act done or not done in violation of a public law prohibiting or mandating it, and for which a punishment is imposed only after conviction (Navarro, 2010). Crimes are defined as mala prohibita ("bad because prohibited") by the Legal Information Institute in 1992; they are unlawful but not necessarily dreadful. Other crimes are categorized as mala in se (meaning "bad in and of itself"), which means they are genuinely dreadful by society standards. Furthermore, many offenses are only punishable under common law (judge made law, not found in legislation). Although the bulk of criminal charges have been codified (made into law), common law criminal offenses still exist in some jurisdictions, such as South Australia. Attorneys for the government are in charge of investigating and prosecuting crimes, of which practically everyone will be a victim at some point in their lives (Legal Services Commission of South Australia, 2021).

The COVID-19 pandemic of 2020 has had an unprecedented influence on the planet (Stickle & Felson, 2020). One of the outcomes, according to preliminary research, is a significant reduction in crime rates in many areas throughout the world (Stickle & Felson, 2020). To combat the spread of the COVID-19 virus, governments throughout the world have imposed severe limitations on social contact and travel (Langton, Dixon & Farrell, 2021). We argue that the government-ordered stay-at-home orders, which impacted entire populations' routine activities, are the primary cause of the change. One of the earliest studies, with perhaps the most striking results,

found a 43 percent drop in crime in San Francisco and a 50 percent drop in Oakland following the city's issuance of some of the most restrictive and early stay-at-home orders in the US, beginning March 16th, 2020 and the two weeks afterward (Shayegh & Malpede, 2020).

Surprisingly, when looking at individual crimes against shops in Los Angeles, significant results are also evident. According to Pietrawska, Aurand, and Palmer (2020a), retail burglary has increased by 64%, while citywide burglary rates have decreased by 10%. Similarly, Pietrawska, Aurand, and Palmer (2020b) found a 74% drop in crimes occurring at restaurants in Chicago during a five-week period, while overall crime decreased by 35%. Pietrawska, Aurand, and Palmer (2020c), continuing their investigation of crime rates in the pandemic outside of a retail emphasis, examined crimes against individuals and crimes against property in four cities for 10 weeks, finding dramatic differences from week to week and across various crime types.

In certain circumstances, research provides surprising or contradictory results. This appears to be due, at least in part, to the small time frames examined and the constraints of the data employed. For example, Payne and Morgan (2020) found no change in violent crime in Queensland, Australia, but they did highlight that the influence of changes in mobility may not have yet manifested itself during the research period. During the COVID-19 epidemic, however, allegations of racially discriminatory conduct toward Asians in the United States have increased dramatically. Since the epidemic, there has been an increase in prejudice, and more than 40% of people have reported an increase in anxiety, depressive symptoms, and sleep problems (Lee & Waters, 2021).

The COVID-19 has a distinct influence on different criminal activities in Dhaka, Bangladesh, according to recent media reports in Bangladesh, which suggest an increase in suicide instances during the pandemic time (Bhuiyan et al. 2020). Domestic and sexual violence are also on the rise, according to the print media (Tithila 2020). The stay-at-home order restricts people's activities, rendering them more confined to their homes; as a result, crimes like burglary are expected to decrease (Campedelli et al. 2020). On the other hand, as employment and education have moved online, various new types of crimes, such as cybercrime, have emerged (Lallie et al. 2020). Restriction of movement may increase the occurrence of violent crimes (e.g., domestic violence, intimate partner violence), whereas robbery, theft, and major assaults may decrease (Bullinger et al. 2020; Pearson 2020).

Developing countries, such as the Philippines, are currently dealing with unavoidable crime issues. The Philippines has been a leader in finding strategies to decrease, if not eliminate, crime. The Double Barrel Plan (DBP), which is used to enforce the drug war (Alao & Baoc, 2021) is one of these techniques. Operational operations have been carried out by police organizations to minimize the chance for would-be offenders to commit crimes (Mark & Sarcena, 2021). Certain forms of crime, such as burglary, street violence, and outdoor assaults, may be significantly reduced by efficient stay-at-home regimens (Eisner and Nivette 2020).

2. Research Methods

2.1. Design

This study employed the descriptive research design. Crime incidents reported and docketed in the police blotter will be retrieved from Ozamiz City Police Station, the only station that serves the 51 barangays in the city.

Permission to carry out the study will be obtained from the PNP ensuring the full confidentiality of the identity of the perpetrators. A checklist will be used for the easy retrieval of information. This design is appropriate for exploring a comprehensive analysis on the crime rate in Ozamiz City during pandemic.

2.2. Settings

The study was conducted in the City of Ozamiz. It is a 3rd class component city in the province of Misamis Occidental, Philippines. The city has a land area of 169.95 square kilometers or 65.62 square miles which constitutes 8.47% of Misamis Occidental's total area. Based on these figures, the population density is computed at 826 inhabitants per square kilometer or 2,139 inhabitants per square mile.

2.3. Data Collection

Data collection is vital in every research endeavor. The researchers gathered their statistical data through Ozamiz City Police Station from the summarize police e blotter through a formal request letter. Further, the minimum health protocol will be observed during the gathering of data considering the pandemic.

2.4. Ethical Consideration

Ethical considerations will always be observed by the researchers. The data that will be gathered will be considered and treated with utmost confidentiality. Moreover, the researchers will adhere to the guidelines set by the Republic Act No. 10173 known as the “Data Privacy Act of 2012”.

2.5. Data Analysis

The study generated the trend analysis and forecasted data of the recorded crimes in Ozamiz City using times series and autoregressive integrated moving average through the GRTEL software. Graphical representations will also be employed in the study.

3. Results and Discussions

3.1. Trend Analysis

Fig.1 presents the trend analysis of Crimes against person committed during 2018 to 2021. Result shows that 2019 has the highest crime occurrence and drastically decline on 2020.

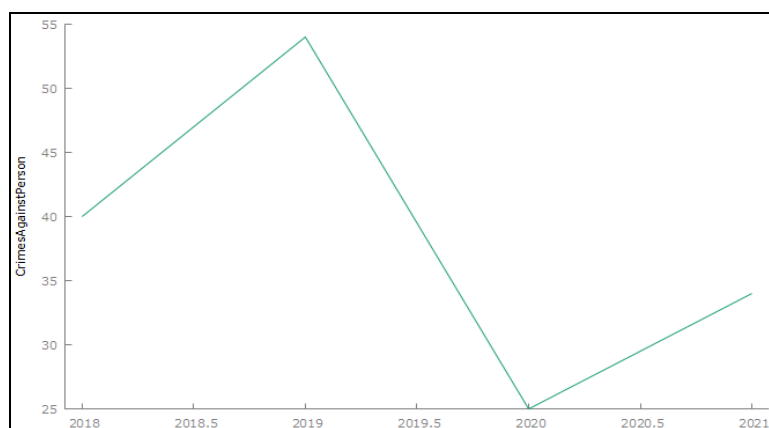


Fig.1. Trend Analysis of Crime against Person

January of the same year the first case of Covid-19 in the Philippines was reported and more reported deaths were recorded. Due to this alarming global crisis Philippine government issued lockdown which is considered the longest and strictest in the world (Hapal, 2021) including Ozamiz City. Residents were not allowed to go out unless to buy food and other personal necessities.



Fig.2. Trend Analysis of Crime against Property

Fig.2 presents the trend analysis of Crimes against property committed during 2018 to 2021. Result shows that 2019 has the highest crime occurrence and started declining during 2020 and totally went down on 2021. Reported cases of Robbery, Malicious Mischief, Theft and other crimes against property decreased due to the Covid-19 pandemic. Caliwan (2020) reported that Lt.Gen. Eleazar said that the Robbery and Theft cases declined by 60 percent since the government imposed strict community lockdowns.

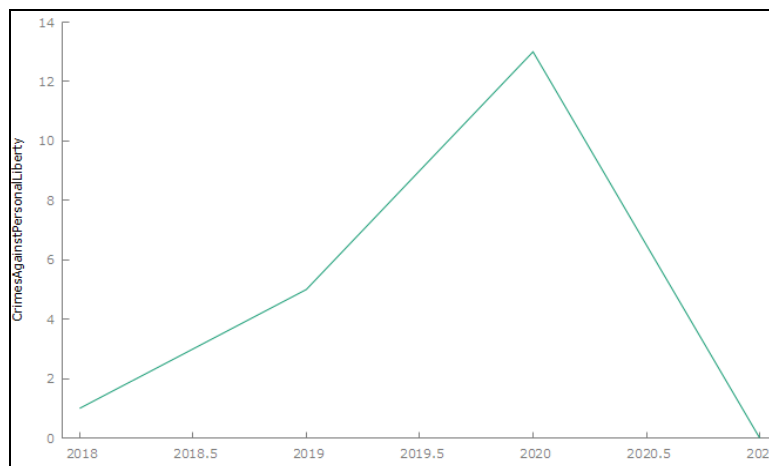


Fig.3. Trend Analysis of Crimes against Personal Liberty and Security

Fig.3 presents the trend analysis of Crimes against personal liberty and security committed during 2018 to 2021. Result shows that 2020 has the highest crime occurrence and drastically decline on 2021. Qualified trespass to dwelling and unjust vexations increased from 2019 to 2020. The violators of these crimes were identified Covid-19 positive or/and person under investigation (PUI) who breached the safety protocols imposed by the Inter Agency Task Force (IATF). They were penalized due to non-cooperation as having the notifiable disease or affected by health event of public concern (The Daily Tribune, 2020).

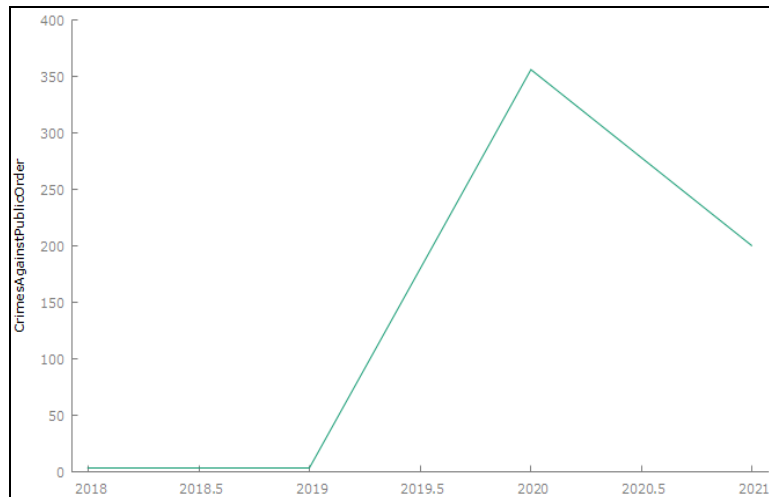


Fig.4. Trend Analysis of Crimes against Public Order

Fig.4 presents the trend analysis of Crimes against public order committed during 2018 to 2021. Result shows that 2020 has the highest crime occurrence and decline on 2021. Among the crimes against public order resistance and disobedience to a person in authority or the agents of such person has the highest crime occurrence in the year of 2020. Civil authorities urged people to reduce the spread of the corona virus however not all groups responded to the Covid-19 crisis including Ozamiz City (Forcyth, 2020).

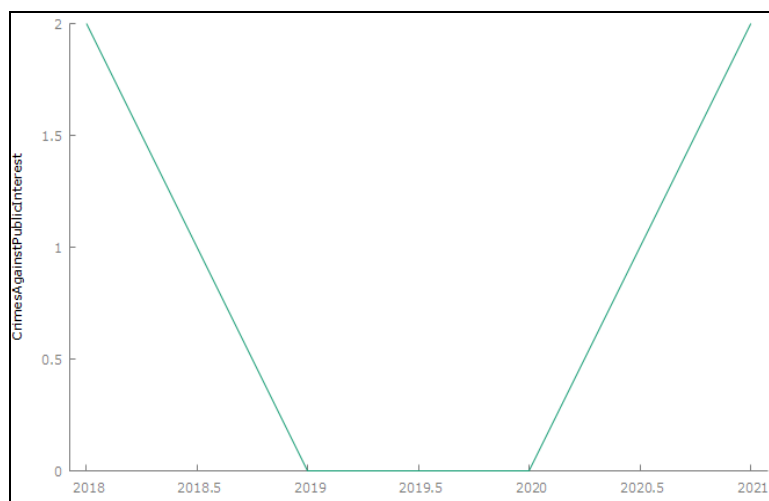


Fig.5. Trend Analysis of Crimes against Public Interest

Fig.5 presents the trend analysis of Crimes against public interest committed during 2018 to 2021. Result shows that the highest crime occurrence started on 2018 and has decline over 2019. On 2020 it then started rising. Two falsification of legislative document were reported only in 2018 and only one case each of falsification by private individual and use of falsified documents and usurpation of authority or official functions. These crimes were not rampant in Ozamiz City unlike with other crimes.

Fig.6 presents the trend analysis of Crimes against honor committed during 2018 to 2021. Result shows that 2020 has the highest crime occurrence and decline on 2021. Two years ago, crimes of Oral defamation and slander by deed were recorded. It was in 2020 were three occurrences of libel were reported. The libel cases were filed because of the false statement uttered or falsely posted in social media and degrades once image (Wahyuni, 2020).

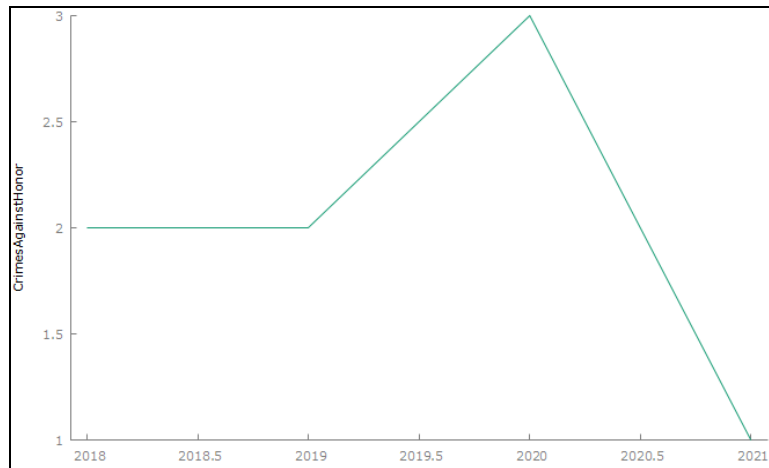


Fig.6. Trend Analysis of Crimes against Honor

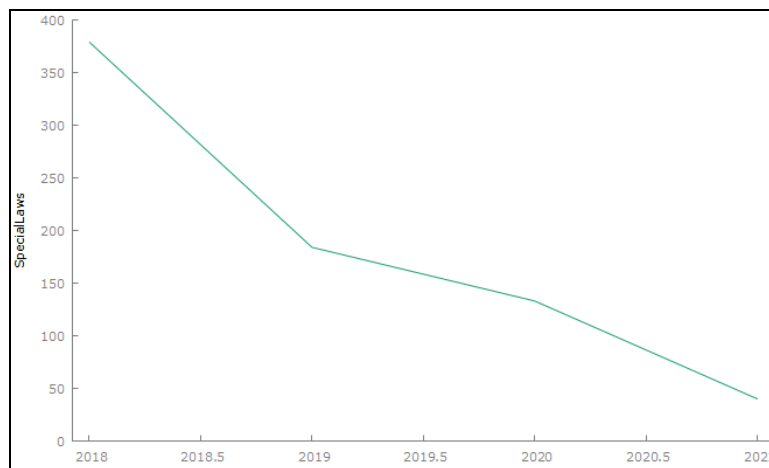


Fig.7. Trend Analysis of Violations of Special Laws

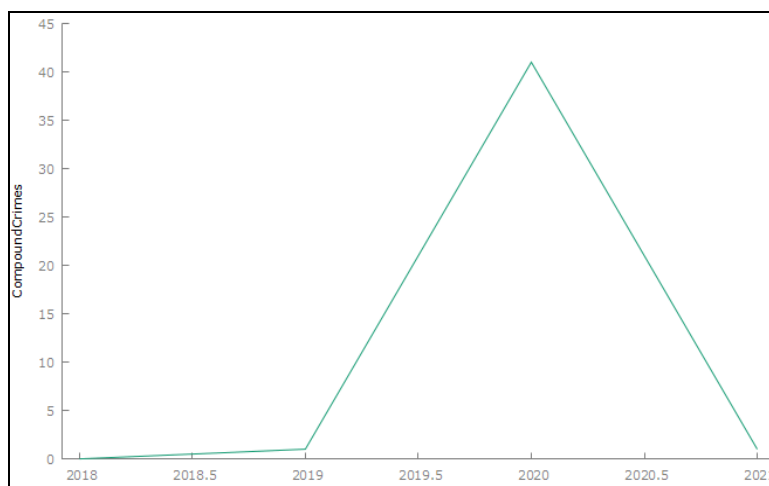


Fig.8. Trend Analysis of Compound Crimes

Fig.7 presents the trend analysis of Special laws committed during 2018 to 2021. Result shows that 2018 has the highest crime occurrence and declined over the years till 2021. Among the special laws recorded it is noteworthy that the occurrence of the violations against comprehensive dangerous drugs act of 2002 was high in 2018 and drastically dropped until 2021. The present administration implements the war on drugs where the law enforcement

officer conducts Oplan Tokhang. A Visayan word “TOKHANG” means to approach and talk. This is part of the campaign to warn drug traffickers and users to stop using drugs. According to the study of Eusebio (2018) law enforcement arm of the Philippine National Police is very effective in enforcing the policy of government on Oplan Tokhang as this is manifested in the absence of crime incidence related to drugs in the locality, however, despite the seriousness of problems confronted, the police forces are still on the go and strongly motivated to do their job of protecting the residents and ensure their safety and to maintain peace in the community.

Fig.8 presents the trend analysis of Compound crimes committed during 2018 to 2021. Result shows that 2020 has the highest crime occurrence and declined during 2021 this is due to the high occurrence of resistance and disobedience to a person in authority or the agents of such person with alarms and scandals it is during this time were in the Inter Agency Task Force strictly implemented the health protocols to contain the spread of covid 19 virus. As the government modified social interactions, the police implemented new safety measures. The changes brought some remarkable resistance to some individuals. Resistance to change is usual as we ask people to walk out from their comfort zones (Lacaniiao, 2021).

3.2. Forecasted Data

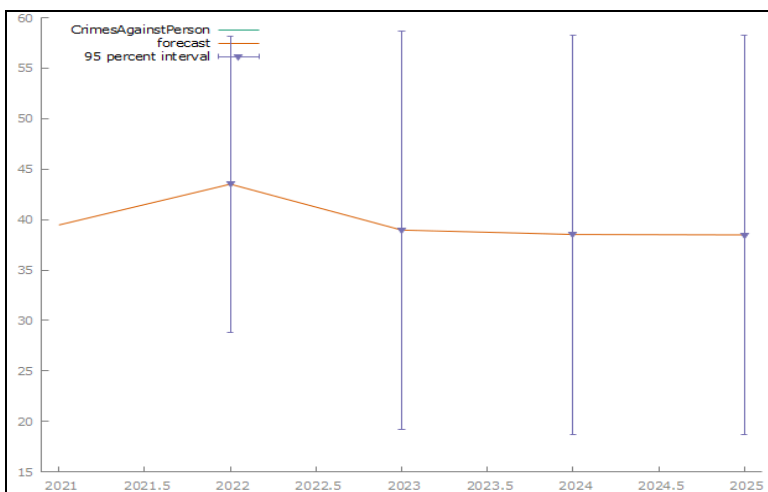


Fig.9. Forecasted Data of Crime against Person

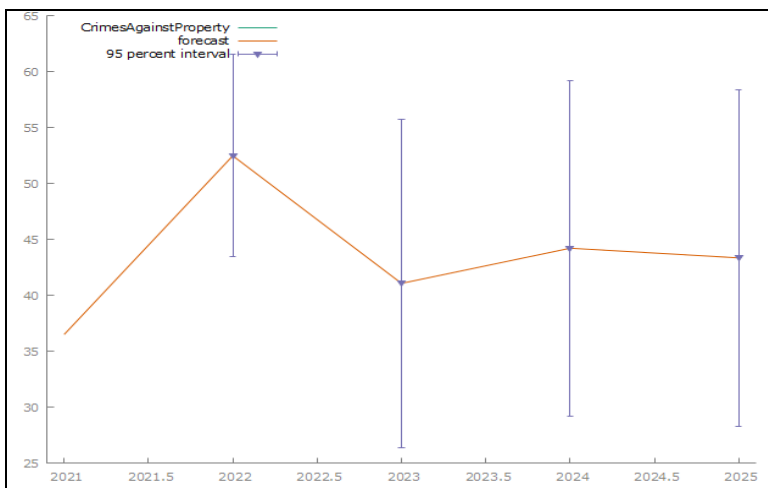


Fig.10. Forecasted Data of Crime against Property

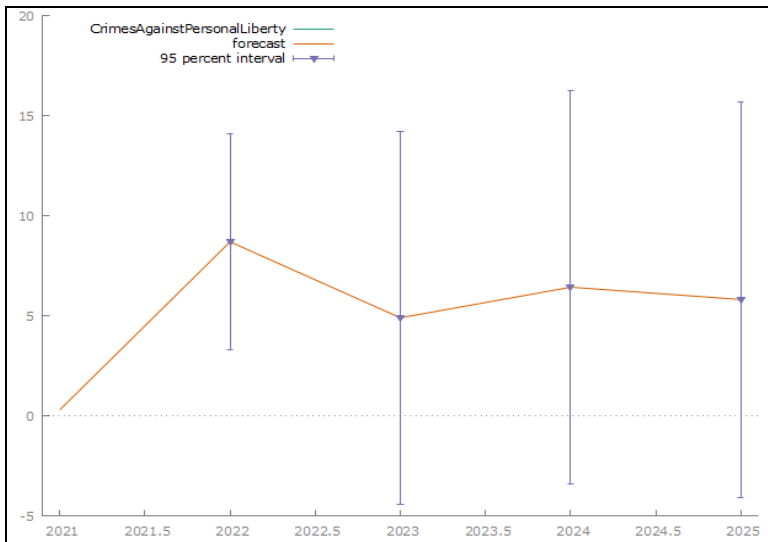


Fig.11. Forecasted Data of Crime against personal liberty and security

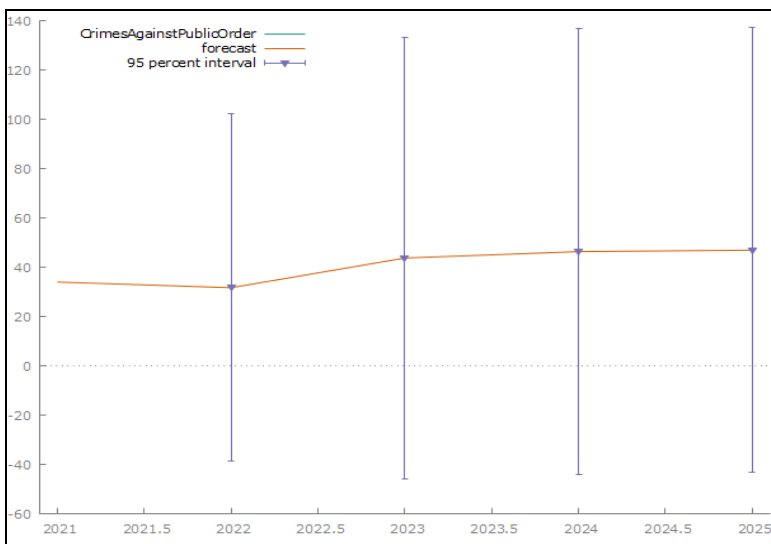


Fig.12. Forecasted Data of Crime against public order

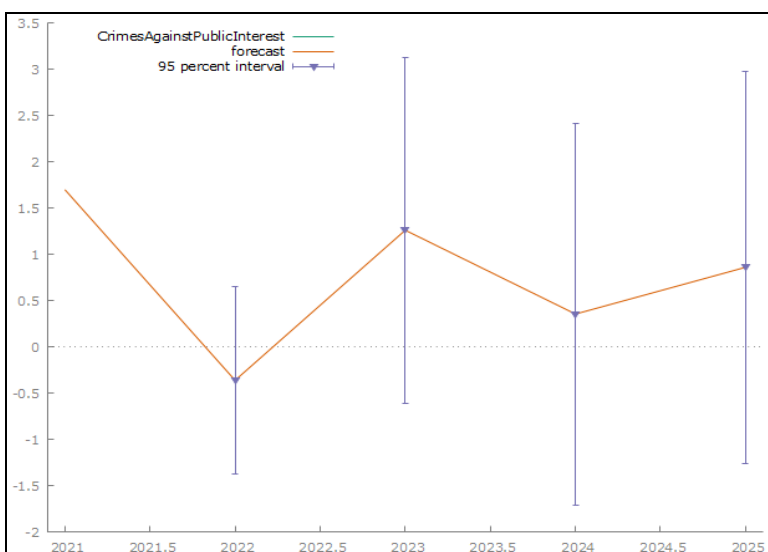


Fig.13. Forecasted Data of Crimes against Public Interest

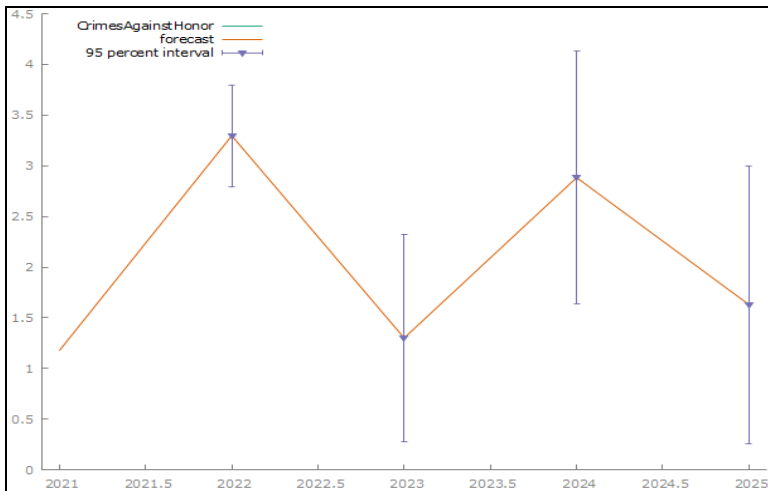


Fig.14. Forecasted Data of Crimes against Honor

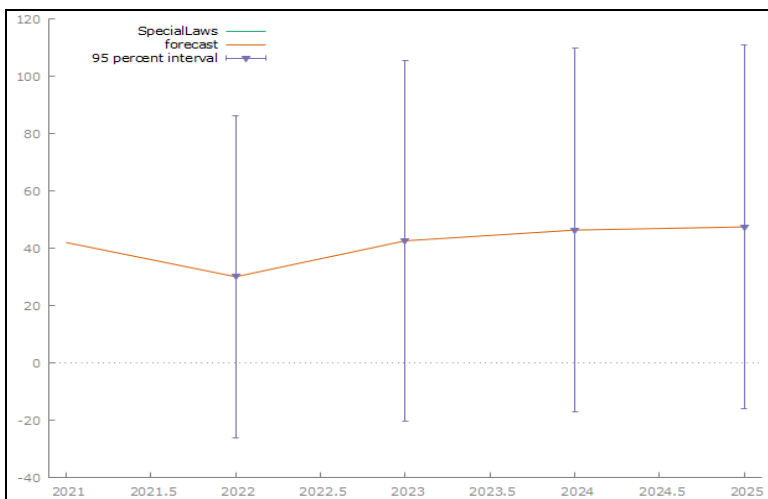


Fig.15. Forecasted Data of Violation of Special Laws

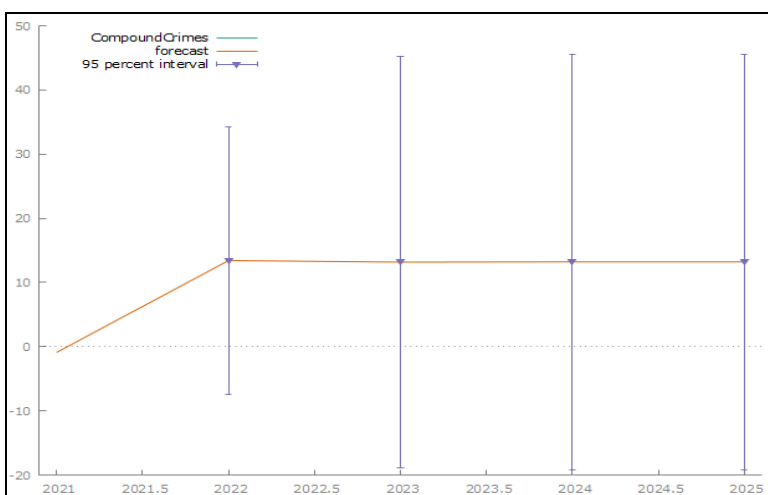


Fig.16. Forecasted Data of Compound Crimes

Forecasted data on crimes against person (Fig.9), against property (Fig.10), against personal liberty and security (Fig.11) and compound crimes (Fig.16) revealed that most of these crimes will most likely to occur in the year 2022 but will be controlled in the succeeding years. This can be attributed to the post pandemic activities where the

safety health protocols are no longer strictly implemented. People can roam around the community and may commit crimes if situation allows. In addition crimes against public order (Fig.12) and violation of special laws (Fig.15) revealed that on year 2022 there will be a slight decrease to the crime violated. This can be attributed to the programs and information drive that will be made by the law enforcement officer to educate the community. In addition crimes against public interest (Fig.13) and public honor (Fig.14) revealed that there will be an unstable of forecasted.

4. Conclusion and Recommendation

Majority of the crimes recorded were drastically decreased in 2020. The CoViD-19 pandemic plays a big role in the reduction of crime occurrence. However, forecasted data revealed that crimes will possible re-occur during post pandemic years. It is recommended by this study that new preventative measures be made for the upcoming years. Future research endeavors may utilize other clustering and forecasting algorithms and conduct a comparative study on the different results.

Declarations

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Competing Interests Statement

The authors declare no competing financial, professional and personal interests.

Consent for publication

Authors declare that they consented for the publication of this research work.

Authors' Contributions

All authors equally contributed in data collection, research and paper drafting.

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